

V.3.3-LIST-FTW FORT WORTH TABULAR TIME SERIES OUTPUT OPERATION

Identifier: LIST-FTW

Application: All programs

Description: This Operation lists time series data for any number of time series in a tabular form.

Time series are not required to have the same units or time interval.

Each time series is printed from the beginning of the run up to the time of the last observed data. If specified by the user, values into the future can also be displayed.

Any combination of time series which have been defined can be displayed using this Operation. If the output is used to display data from a stream gaging site with a Rating Curve, information on the rating can be printed if desired.

For each time series, the number of digits to the left and right of the decimal point and the print time interval must be specified. Also, the number of ordinates into the future to be listed has to be input for each time series. Since each time series might have different print intervals, not every time step will have data printed for each time series.

Based on the minimum print time interval and the number of digits to the right and left of the decimal for each time series, the print format is determined. A heading with the time of each value is generated. While allowing for different print intervals, all time series are printed using this format and correspond to times in the heading. If more values than can be printed in a single line are required, the procedure is repeated until all values have been printed. Since each time series may have a different number of values into the future printed, the format might change from heading to heading.

When displaying runoff time series (MARO), some values may have been modified using MODs. All values in a MARO time series which have been changed will be flagged with an asterisk (*).

The output includes of the following information:

<u>Line</u>	<u>Contents</u>
1	Blank
2	Title line - 72 character title describing the output - there can be a maximum of 10 title lines

Lines 3-5 only appear if a Rating Curve is associated with this output:

<u>Line</u>	<u>Contents</u>
3	Flood of record information - stage, flow and date of the flood of record
4	Critical stages - Stage and flow at flood stage, secondary flood stage and bankfull stage
5	Optional information - All optional information for the Rating Curve will be printed
6	Blank
7	End of Hydrologic Day Line - the appropriate flag is printed to denote the end of hydrologic days (both past and future)
8	Date/time heading line 1 - prints month and day of data to be listed
9	Date/time heading line 2 - prints the time of the data to be listed
10	Date/time heading line 3 - contains '---' indicators above columns of data
11	Time series data - contains information defining the time series and the data for the time series for the times indicated in the time series heading lines

Line 11 is repeated for each time series which has data which should be printed.

Lines 6-11 are repeated if there is insufficient room on the line to print all the values which are needed.

Time series with a dimension of L3 (volume) will be treated differently than others. These time series can either be printed in units of acre-feet (English) or thousand cubic meters (Metric) or as a flow rate over a time period. When displaying flowrate over a time period, the following conversion is made:

$$\text{value} = \text{value} * (24 / \text{time interval})$$

Output is only generated if print output is allowed during this run. In addition, control time series can be specified. If all control time series have no values above a preset criteria, printer output is turned off.

When printer output is allowed, a time series can always be printed. A time series can also have output suppressed if none of it's data values exceed a user specified limit.

The following rules will be followed:

1. At least one title line must be used.

2. Maximum column width is 132.
3. Maximum number of blank lines which can be specified between time series is 10.
4. All time series and Rating Curves must exist.
5. The interval to print a time series must be an even multiple of the time series time interval.
6. The time series print interval must be either 1, 2, 3, 6, 12 or 24 hours.
7. All time series print intervals must be an even multiple of the minimum time series print interval.

Developed By: West Gulf River Forecast Center

Allowable Data Time Intervals: 1, 2, 3, 4, 6, 8, 12 and 24 hours

All time series are input time series and no modifications are made to them.

Time series intervals can be 4 or 8 hours but the interval to print the time series must meet criteria 6 above.

Time Series Used: Any combination of time series can be tabulated. Only data types with one value per time interval are allowed.

Input Summary: The card input for this Operation is as follows:

<u>Card</u>	<u>Format</u>	<u>Columns</u>	<u>Contents</u>
1	3X,I2	4-5	Number of title lines to print; minimum is 1 and maximum is 10
	3X,I2	9-10	Number of time series to display
	I5	11-15	New page option: 0 = do not begin print out with new page 1 = begin printout on new page
	2X,I3	18-20	Maximum number of columns to use for print; maximum value is 132
	1X,A4	22-25	Designator for end of previous hydrologic days
	1X,A4	27-30	Designator for end of current hydrologic day

<u>Card</u>	<u>Format</u>	<u>Columns</u>	<u>Contents</u>
	1X,A4	32-35	Designator for end of future hydrologic days
	2X,A8	38-45	Rating Curve identifier which will be used to print information at the beginning of the display; if no Rating Curve is input none of the pertinent stage information will be listed
	3X,I2	49-50	Number of blank lines to be included in the time series; these blank lines appear between individual time series; the maximum number of blank lines is 10
	10I2	51-52 53-54 55-56 . . 69-70	The number of the time series which a blank line will be printed after; this number is based on the order the time series are entered (Card 3 order)

Repeat Card 2 for each title line. There must be at least one title card.

2	A72	1-72	Title to be printed at the beginning of the tabular output
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Repeat Cards 3 and 4 for each time series to be displayed.

3	A8	1-8	Identifier of time series
	2X,A4	11-14	Data type code of time series
	4X,I2	19-20	Data time interval of time series in hours
	3X,I2	24-25	Data time interval in hours between displayed ordinates (print data time interval)
	I5	26-30	Option to not print missing data: 0 = print missing data 1 = do not print missing data
	1X,A4	32-35	User specified identifier
	3X,I2	39-40	Number of time intervals into the future to display; this refers to the number of print time intervals; for example an observed time series will not have any data into the future and should have '0' in column 40
	3X,I2	44-45	Number of characters to print to the right of the decimal in tabular output

<u>Card</u>	<u>Format</u>	<u>Columns</u>	<u>Contents</u>
	3X,I2	49-50	Number of characters to print to the left of the decimal in tabular output; this must include sufficient space to print the highest expected value in the time series
	4X,I1	55	Print control option: 0 = time series is always printed when tabular output is warranted 1 = time series is printed if at least one value exceeds the print criteria input 2 = control time series which must have at least a single data value above the specified criteria or the entire tabular output is not generated
	4X,I1	60	Volume print control: 0 = L3 time series are printed in acre feet (English) or thousand cubic meters (metric) 1 = volumes are printed as the average flow rate

Card 4 is needed only if print criteria option is 1 or 2.

4	F15.5	1-15	Print criteria value if print control option is 1 or 2
	4X,I1	20	English/Metric indicator for the print criteria: 0 = English units 1 = Metric units

Sample Input and Output: Sample input is shown in Figure 1. Sample output from the parameter print routine is shown in Figure 2. Sample output from the execution routine is shown in Figure 3.

Error and Warning Messages: The error and warning messages generated by this Operation and the corrective action to take when they occur are as follows:

1. ****ERROR**** NUMBER OF TITLE LINES=XX. IT MUST BE GREATER THAN 0 AND LESS THAN OR EQUAL TO 10.

Action: Specify number of title lines to be between 1 and 10 inclusive.
2. ****ERROR**** NUMBER OF TIME SERIES TO TABULATE =XX
IT MUST BE GREATER THAN 0.

Action: Specify at least one time series to print.

3. **ERROR** NUMBER OF PRINT COLUMNS=XX
IT MUST BE LESS THAN OR EQUAL TO 132.

Action: Specify number of print columns to be less than or equal 132.

4. **ERROR** NUMBER OF BLANK LINES IN DISPLAY=XX
IT MUST BE GREATER THAN OR EQUAL TO 0 AND LESS THAN OR EQUAL TO 10.

Action: Specify the number of blank lines between 0 and 10 inclusively.

5. **ERROR** OPTION TO PRINT BLANK LINES BETWEEN TIME SERIES.
ENTRY IS XX. IT MUST BE BETWEEN 0 AND THE NUMBER OF TIME SERIES.

Action: When inputting the number of time series to print a blank line after, all entries must be greater than or equal to 0 and less than or equal to the number of time series.

6. **ERROR** TIME SERIES PRINT INTERVAL=XX
IT MUST BE 1, 2, 3, 6, 12, OR 24.

Action: Specify a time series print interval of 1, 2, 3, 6, 12, or 24 hours.

7. **ERROR** TIME SERIES PRINT INTERVAL=XX
IT MUST BE AS LARGE AS AND AN EVEN MULTIPLE OF THE TIME SERIES INTERVAL (YY).

Action: Specify a time series print interval which is an even multiple of the time series time interval.

8. **ERROR** PRINT CRITERIA OPTION=XX
IT MUST BE 0, 1, or 2.

Action: Specify a print option of 0, 1, or 2.

9. **ERROR** ENGLISH/METRIC UNITS OF PRINT CRITERIA IS XX
IT SHOULD BE 0 OR 1.

Action: Select an ENGLISH/METRIC switch for the print criteria value of either 0 or 1.

10. **ERROR** MINIMUM TIME SERIES PRINT INTERVAL=XX
TIME SERIES YY HAS A TIME INTERVAL OF ZZ.
THESE MUST BE EVEN MULTIPLES.

Action: Select a print time interval for this time series which is an even multiple of the minimum time series print interval.

Carryover Transfer Rules: There is no carryover for this Operation.

Punch Card Limitations: There are no punch card limitations for this Operation.

Figure 1. Sample Card Input For Operation LIST-FTW

```

      10      20      30      40      50      60      70      80
-----+-----+-----+-----+-----+-----+-----+-----+
LIST-FTW  CHTNC
  10    7    0 132 PAST TDAY FCST                1 2 5

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*** CHARITON R. NR CHARITON ***

- SNOW AND RAINFALL/RUNOFF MODEL SUMMARY -
CHTNC  MAP      6    6    1 MAP      4    2    2    0    0
CHTNC  MAT      6    6    1 MAT     20    0    3    0    0
CHTNC  RAIM     6    6    1 RAIM    20    2    2    0    0
CHTNC  INFW     6    6    1 RO      20    2    2    2    0
      .05      0
CHTNC  SWE     24   24    1 W.E.    5    2    2    0    0
CHTNC  APIS    24   24    1 API     5    2    2    0    0
CHTNC  AIAI    24   24    1 AI      5    2    2    0    0

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Figure 2. Sample Output From Operation LIST-FTW Print Parameter Routine

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*****
LIST-FTW OPERATION   NAME=CHTNC   PREVIOUS NAME=
*****

WGRFC TABULAR OUTPUT OPERATION
GENERAL PARAMETERS
# TITLE # TIME NEW YDA TDA TMA RATING NUMBER
LINES SERIES PAGE FLAG FLAG FLAG CURVE COLUMNS
10      7 NO PAST TDAY FCST NONE 132.

TITLE LINE 1:
2:
3:
4: #####
5: #####
6:
7:
8: *** CHARITON R. NR CHARITON ***
9:
10: - SNOW AND RAINFALL/RUNOFF MODEL SUMMARY -

OUTPUT FORMAT AND TIME SERIES
TIME SERIES INT PRT ENGL METR INTO LEFT RIGHT MSNG RFC METRIC TO ENGLISH CON PRINT OPTION
TSID TYPE HRS INT UNIT UNIT FUTURE DEC DEC VALS ID ENG=MET*SLOPE + INT SLOPE INT
-----
1 : CHTNC MAP 6 6 IN MM 4 2 2 YES MAP .039 .000 ALWAYS PRINT
2 : CHTNC MAT 6 6 DEGF DEGC 20 3 0 YES MAT 1.800 32.000 ALWAYS PRINT
3 : BLANK
4 : CHTNC RAIM 6 6 IN MM 20 2 2 YES RAIM .039 .000 ALWAYS PRINT
5 : CHTNC INFW 6 6 IN MM 20 2 2 YES RO .039 .000 CRITERIA> .050 IN
6 : CHTNC SWE 24 24 IN MM 5 2 2 YES W.E. .039 .000 ALWAYS PRINT
7 : CHTNC APIS 24 24 IN MM 5 2 2 YES API .039 .000 ALWAYS PRINT
8 : CHTNC AIAI 24 24 REAL REAL 5 2 2 YES AI 1.000 .000 ALWAYS PRINT

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Figure 3. Sample Output From Operation LIST-FTW Execution Routine

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*** CHARITON R. NR CHARITON ***

- SNOW AND RAINFALL/RUNOFF MODEL SUMMARY -

TIMES ARE MST				PAST							PAST				PAST		
TS	TYPE	TS	TS	3/29	3/29	3/29	3/30	3/30	3/30	3/30	3/31	3/31	3/31	3/31	4/ 1	4/ 1	4/ 1
ID	CODE	INT	UNIT	11 AM	5 PM	11 PM	5 AM	11 AM	5 PM	11 PM	5 AM	11 AM	5 PM	11 PM	5 AM	11 AM	5 PM
CHTNC	MAP	MAP	6 IN	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.01
CHTNC	MAT	MAT	6 DEGF	36.	32.	24.	15.	27.	40.	30.	18.	27.	44.	36.	34.	37.	46.
CHTNC	RAIM	RAIM	6 IN	.00	.00	.00	.00	.00	.00	.02	.01	.00	.15	.14	.07	.10	.32
CHTNC	INFW	RO	6 IN	.00	.00	.00	.00	.00	.00	.00	.00	.00	.05	.07	.05	.07	.24
CHTNC	SWE	W.E.	24 IN				2.36				2.34				1.98		
CHTNC	APIS	API	24 IN				.50				.52				.81		
CHTNC	AIAI	AI	24 REAL				3.20				3.10				2.80		
TIMES ARE MST				TDAY					FCST								
TS	TYPE	TS	TS	4/ 1	4/ 2	4/ 2	4/ 2	4/ 2	4/ 3								
ID	CODE	INT	UNIT	11 PM	5 AM	11 AM	5 PM	11 PM	5 AM								
CHTNC	MAP	MAP	6 IN	.56	.02	.00	.00	.00	.00								
CHTNC	MAT	MAT	6 DEGF	48.	45.	38.	42.	47.	48.								
CHTNC	RAIM	RAIM	6 IN	.93	.26	.08	.10	.12	.10								
CHTNC	INFW	RO	6 IN	.83	.22	.08	.09	.08	.07								
CHTNC	SWE	W.E.	24 IN		.95				.54								
CHTNC	APIS	API	24 IN		2.11				2.43								
CHTNC	AIAI	AI	24 REAL		1.50				1.30								